

## Quiz #1

February 18, 1999

Part I: (50 points - 25 minutes) Carefully define and explain the significance of FOUR (only 4) of the following five concepts (No more than one per bluebook page)

1. Non-rival consumption
2. Position of the least advantaged
3.  $MRS^a + MRS^b = MRT$
4. Median voter
5. Laffer curve (function)

Part II: (50 points - 25 minutes) The town of Nottingham possesses a beautiful harbor with great potential. Unfortunately, it is not used by commercial shippers because there is no lighthouse.

An entrepreneur offers to build and operate a lighthouse for the town. In return for the exclusive right to provide light-house services, all the entrepreneur asks for the right to charge a lighthouse toll that each boat entering the harbor would be required to pay. The town would be responsible for making sure that each boat pays the toll.

Engineers estimate that the cost of constructing the bridge would be \$1 million. In addition, the annual maintenance and operating costs would be \$100,000. Properly maintained, the lighthouse will last forever.

An econometrician has estimated that the construction of a lighthouse would lead to the active use of the harbor. She estimates that the number of ships entering the harbor each year ( $q$ ) would depend on the toll ( $p$ ) in accordance with the following demand function:  $q = 2000 - 4p$ .

- a) If the lighthouse is built, what toll will the profit maximizing entrepreneur want to charge? How many boats will enter the harbor if this toll is charged? How much profit will the lighthouse owner make each year, assuming that the entrepreneur will have to pay 10% interest on the capital that will be tied up in the lighthouse investment?
- b) A member of the town council argues that rather than give an exclusive franchise to the entrepreneur, the privilege of operating the lighthouse should be auctioned off to the highest bidder. Assuming that there is a competitive market on the part of lighthouse entrepreneurs, how much will the town receive for auctioning off the lighthouse franchise to the highest bidder? Explain your estimate. What toll will the successful franchise bidder charge?
- c) Does the predicted outcome you determined in part b constitute an efficient allocation of resources? Explain. Can you devise a scheme for financing the lighthouse that would yield a better outcome than that which you predicted in part b?